

## Taxonomic Study of Korean Cantharidae (Coleoptera) II. Cantharinae: Genus *Podabrus*

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**Abstract** The genus *Podabrus* of the Korean Cantharidae are reviewed. Since Heyden (1887) who had first reported *P. heydeni* Kiesenwetter, nine species have been recorded hitherto. But it is confirmed that five species of them were erroneously misidentified, and three new species, *P. jirisanensis* n. sp., *P. fragiliformis* n. sp. and *P. circumangulatus* n. sp., are described. Key to Korean genera of the subfamily Cantharinae and to Korean species of the genus *Podabrus* are provided.

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**Key words** Coleoptera, Cantharidae, Cantharinae, *Podabrus*, Korea, taxonomy

### INTRODUCTION

Korean Cantharinae is enumerated with thirty one species of eight genera. But several species were erroneously reported due to general faunistic surveys by non-specialists. As the first part of the subfamily Cantharinae, genus *Podabrus* is reviewed. Korean *Podabrus*, since Heyden (1887) reported *P. heydeni* Kiesenwetter for the first time, have been recorded with nine species hitherto. *Podabrus ochoticus* Motschulsky, *P. rosinae* Pic, and *P. nigriventris* Fischer were reported by Wittmer (1969), and recently Kazantsev (1996) reported *P. glochidiatus* Kazantsev, and synonymized *P. ochoticus* Motschulsky with *P. annulatus* Mannerheim, based on North Korean materials. However, Korean *Podabrus* have not been systematically studied by specialists.

The Korean *Podabrus* comprises three subgenera; *Podabrus*, *Hatchiana*, and *Asiopodabrus*, but each subgenus has often been confused due to their superficial similarity, and often identified to Japanese ones. Five of nine recorded species were erroneously misidentified. *P. nigriventris* Fischer is still doubtful in its distribution in Korea. In this paper, three new species and one new subspecies are described.

Examined 1,298 materials are mostly kept in the collection of Sungshin University, and some others in Korea University, Agriculture of Seoul National University and Natural History Museum of Ewha University. Abbreviations used for provinces are as follows: Seoul (S), Gangweondo (GW), Gyeonggido (GG), Chungbuk (CB), Chungnamdo (CN), Gyeongbuk (GB), Gyeongnam (GN), Jeonbuk (JB), Jeonnam (JN).

## SYSTEMATICS

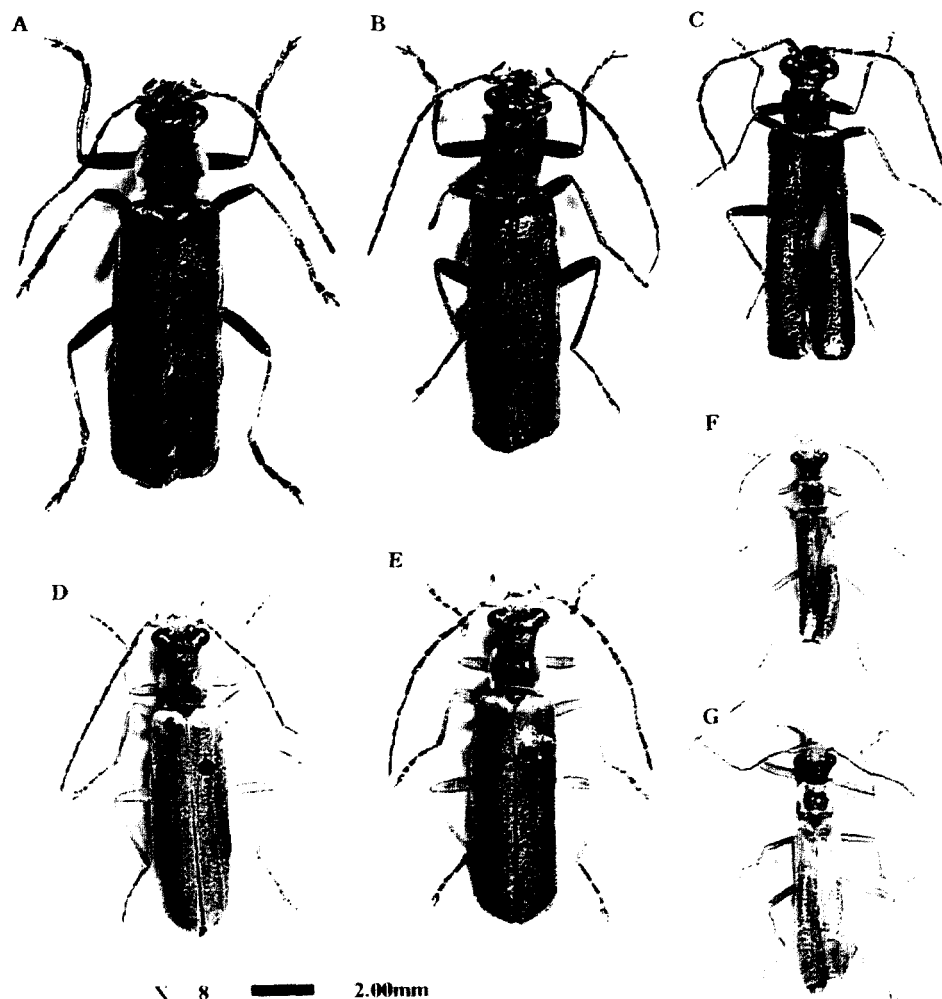
### Subfamily Cantharinae

Imhoff, 1856. Privately Pub. Basel, 31: 69. Type genus: *Cantharis* Linné, 1758.

*Diagnosis.* Body color various, rarely metallic. Head prognathous, slightly round, or rarely elongated. Gular sutures widely separated, or rarely converged. Eye convex. Antennae filiform. Fourth segment of maxillary palpi hatchet-like. Pronotum flat. Elytra long and covered abdomen. Hind wing not exposed behind elytra. Last segment of sternite and aedeagus symmetric. Tibia with apical spurs.

### Key to the Korean genera and subgenera of the Cantharinae

1. Head strongly narrowed behind eye. Gular sutures converged and well distincted along their entire length ..... *Podabrus* (*s. lato*) ..... 2
- Head gradually narrowed behind eye. Gular sutures widely separated ..... 4
2. All tarsal claws bifid or toothed ..... 3
- Tarsal claws of fore and middle legs bifid at apex, hind legs toothed at basal part in male, but female with blunt tooth at basal part ..... *Podabrus* (*Asiopodabrus*)
3. All tarsal claws bifid at apex in male, but female blunt toothed at basal part ..... *Podabrus* (*s. str.*)
- All tarsal claws toothed at basal part ..... *Podabrus* (*Hatchiana*)
4. Some tarsal claws bifid or toothed ..... 5
- All tarsal claws simple in both sexes ..... *Athemus* (*Athemellus*)
5. Tarsal claws toothed at basal part ..... 6
- Tarsal claws bifid at apex. Some claws toothed at basal part ..... *Rhagonycha* (*s. lato*) ..... 10
6. Tarsal claws toothed at basal part in both sexes ..... 7
- Tarsal claws toothed at basal part in one sex ..... 9
7. All outer tarsal claws blunt toothed at basal part ..... *Cantharis* (*s. lato*) ..... 8
- Outer tarsal claws of fore and middle legs sharp toothed at basal part ..... *Athemus* (*Andrathemus*)
8. Dorsal plate of basal piece of aedeagus normally developed, usually longer or slightly shorter than parameres ..... *Cantharis* (*Telephorus*)
- Dorsal plate of basal piece of aedeagus reduced, exposing basis of parameres and laterophyses ..... *Cantharis* (*s. str.*)
9. All tarsal claws simple in male, but outer tarsal claws toothed at basal part in female ..... *Athemus* (*s. str.*)
- All outer tarsal claws toothed at basal part in male, but all tarsal claws simple in female ..... *Wittmercantharis*
10. All tarsal claws bifid at apex in both sexes ..... *Rhagonycha* (*s. str.*)
- Inner tarsal claws of middle and hind legs toothed at basal part in male, but outer tarsal claws bifid at apex. All tarsal claws of female simple ..... *Rhagonycha* (*Ussurycha*)



**Fig. 1.** Adult of the genus *Podabrus*, male: A. *P. (s. str.) annulatus*; B. *P. (s. str.) longissimus*; C. *P. (Hatchiana) rosinae*; D. *P. (Hatchiana) glochidiatus*; E. *P. (Hatchiana) chirisanensis* sp. nov.; F. *P. (Asiopodabrus) fragiliformis* sp. nov.; G. *P. (Asiopodabrus) circumangulatus* sp. nov.

### Tribe Podabrini

Leconte, 1881. Trans. Amer. Ent. Soc. 9: 44, 45.

### Genus *Podabrus* Westwood, 1838

Introd. mod. Class. Ins. II, App. Gen. Synops.: 27. Type species: *Cantharis alpinus* Paykull, 1798.

*Diagnosis.* Head strongly narrowed behind eyes; gular sutures converged and well distinct along their entire length; all tarsal claws of both bifid or toothed in both sexes. This genus includes three subgenera,

*Podabrus*, *Hatchiana*, and *Asiopodabrus*. Diagnosis of each subgenus are as follows: *Podabrus*: All tarsal claws bifid at apex in male, but female blunt toothed at basal part; *Hachiana*: All tarsal claws toothed at basal part; *Asiopodabrus*: Tarsal claws of fore and middle legs bifid at apex, hind legs toothed at basal part in male, but female blunt toothed at basal.

### Key to the Korean species of the genus *Podabrus*

1. All tarsal claws bifid or toothed ..... 2
  - Tarsal claws of fore and middle legs bifid at apex, hind legs blunt toothed at basal part, but female blunt toothed at basal tooth ..... 6
2. All tarsal claws bifid at apex in male, but female blunt toothed at basal part ..... 3
  - All tarsal claws blunt toothed at basal part ..... 4
3. Eye relatively small, ratio of eye diameter to intereye distance 1.00 : 3.45. Side margin of pronotum slightly archform curved. Scutellum with sharp apex ..... *Podabrus* (s. str.) *annulatus* Mannerheim
  - Eye relatively large, ratio of eye diameter to intereye distance 1.00 : 2.66. Side margin of pronotum slightly sinuated. Scutellum with round apex ..... *Podabrus* (s. str.) *longissimus* Pic
4. Body color various ..... 5
  - Body color black ..... *Podabrus* (*Hatchiana*) *rosinae* Pic
5. Eye relatively small, ratio of eye diameter to intereye distance 1.00 : 3.10. Side margin of pronotum slightly archform curved. Scutellum with sharp apex .... *Podabrus* (*Hatchiana*) *glochidiatus* Kazantsev
  - Eye relatively large, ratio of eye diameter to intereye distance 1.00 : 2.80. Side margin of pronotum slightly sinuated. Scutellum with round apex ..... *Podabrus* (*Hachiana*) *jirisanensis* n. sp.
6. Anterior corners of pronotum obtusely angulated. Scutellum with round apex ..... *Podabrus* (*Asiopodabrus*) *fragiliformis* n. sp.
  - Anterior corners of pronotum round. Scutellum with sharp apex ..... *Podabrus* (*Asiopodabrus*) *circumangulatus* n. sp.

### ***Podabrus* (s. str.) *annulatus* Mannerheim, 1825**

(Figs 1A, 2A)

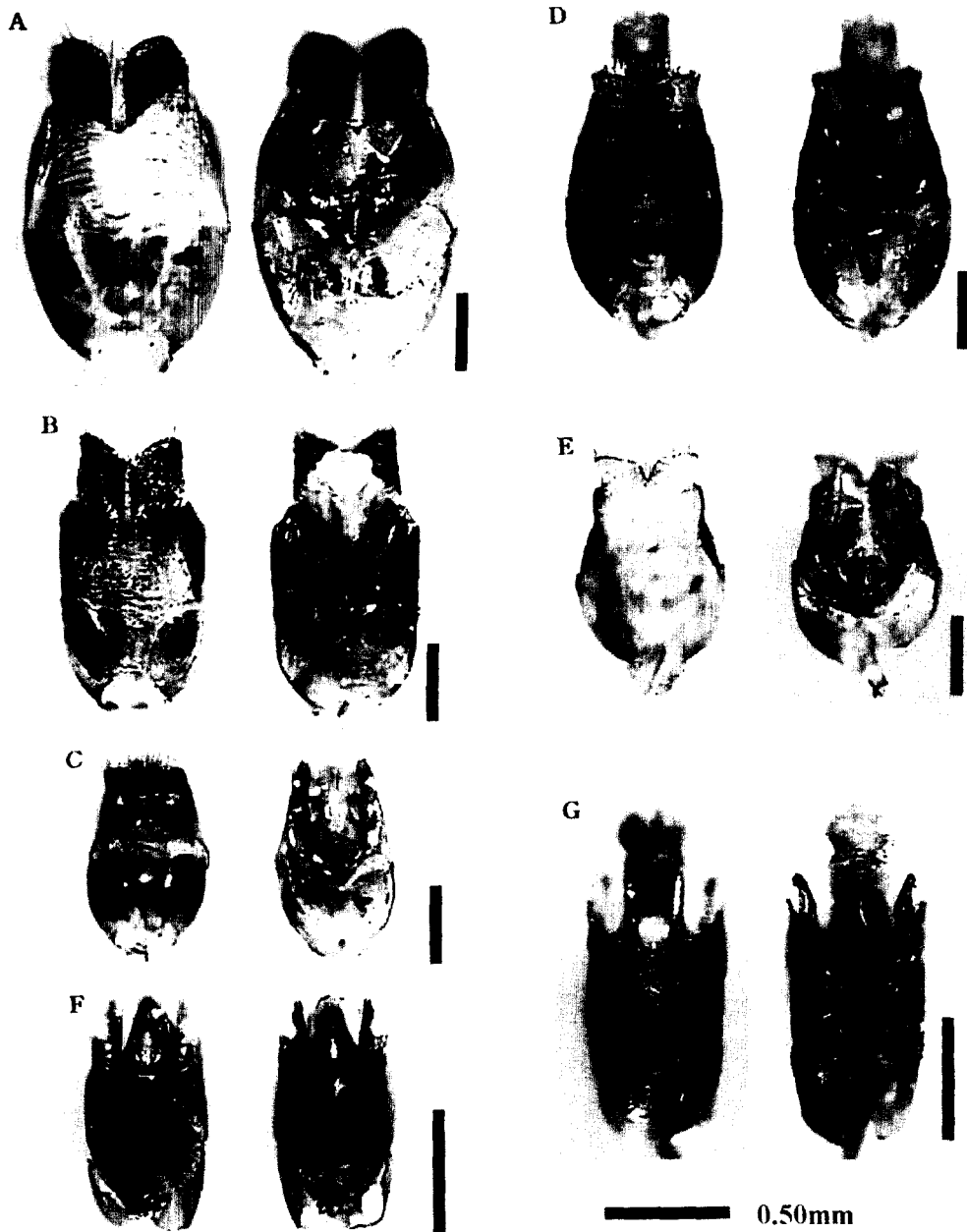
Essais ent. I. 4: 28.

*Podabrus longissimus*: Cho, 1967: 193; Kim and Kim, 1971: 156; Kim and Kim, 1972a: 78; Kim and Nam, 1984b: 329; Kim, 1993: 201; Kim *et al.*, 1994: 148; Kim *et al.*, 1994: 181; Kwon *et al.*, 1996: 155; Kim and Kim, 1998: 171. (misid.)

*Podabrus ochoticus*: Wittmer, 1969: 107; Delkeskamp, 1977: 18; Medvedev and Ryvkin, 1992: 35; Kwon *et al.*, 1996: 115. (synonymize by Kazantsev (1996)).

*Themus episcopalıs*: Kim and Kim, 1971: 156; Kim *et al.*, 1994: 181; Kwon *et al.*, 1996: 155; Kim and Kim, 1998: 171. (misid.)

*Athemus attristatus*: Kim and Kim, 1971: 156; Kim *et al.*, 1972: 221; Kim *et al.*, 1992: 154; Kim *et al.*, 1994: 181; Shin *et al.*, 1996: 301; Kim and Kim, 1996: 48; Kim and Kim, 1996: 128; Kwon *et*



**Fig. 2.** Aedeagus of the genus *Podabrus*, A. *P. (s. str.) annulatus*; B. *P. (s. str.) longissimus quadratithoracicus*; C. *P. (Hatchiana) rosinae*; D. *P. (Hatchiana) glochidiatus*; E. *P. (Hatchiana) chirisanensis* sp. nov.; F. *P. (Asiopodabrus) fragiliformis* sp. nov.; G. *P. (Asiopodabrus) circumangulatus* sp. nov. (Each bar of 0.50 mm)

*al.*, 1996: 155; Kim and Kim, 1998: 171. (misid.)

*Athemus nigerrimus*: Kim *et al.*, 1992: 154; Kim *et al.*, 1994: 148; Shin *et al.*, 1996: 301; Kim and

Kim, 1996: 48. (misid.)

*Material examined* (276ex). S- GW- 1 ♂, Mt. Duta, Donghae, 14 VI 1997; 2 ♀, Mt. Seolak, Sokcho, 2 VI 1982, 30 V 1998; 1 ♂, 4 ♀, Mt. Chiak, Weonju, 6 VI 1974, 28 V 1985, 5 VI 1992; 10 ♂, 10 ♀, Mt. Taebaek, Taebaek, 30 V 1999; 1 ♀, Mt. Hyangrobong, Goseong, 18 VI 1967; 2 ♂, 1 ♀, Mt. Daeam, Yanggu, 13 VI 1990, 24 V 1998; 4 ♂, 5 ♀, Temple Baekdamsa, Mt. Seolak, Inje, 3-5 VI 1979, 25 V 1986; 6 ♂, 4 ♀, Mt. Bangtae, 4-6 VI 1999; 7 ♂, 6 ♀, Mt. Gariwang, Jeongseon, 21 V 1998, 22 V 1998; 2 ♂, 7 ♀, Mt. Gyeong, Pyeongchang, 16 VI 1993, 20 V 1995; 2 ♀, Mt. Unduryeong, 17 VI 1993; 6 ♀, Mt. Odae, 24 VI 1998; 7 ♂, 17 ♀, Sambongyaksu, Mt. Odae, Hongcheon, 8-10 VI 1995, 29-30 VI 1997, 4 VI 1998, 5 VI 1998; 4 ♀, Mt. Odae, 14-15 VII 1992, 24 VI 1994, 30 VI 1997; 1 ♀, Undoori, 17 VI 1993; 7 ♂, 48 ♀, Mt. Gachilbong, 21-23 VI 1984, 9 VI 1995. GG- 2 ♀, Mt. Cheonggye, Gwacheon, 24-26 VI 1984; 3 ♀, Mt. Cheonma, Namyangju, 9 VI 1974, 11 VI 1981, 24 VI 1984; 1 ♀, Gwangreung, 13 VI 1981; 1 ♀, Temple Bogwangsa, Mt. Gyemyeong, Paju, 3 VI 1982; 2 ♀, Mt. Hwaak, Gapyeong, 29 V 1998; 1 ♀, Mt. Myeongji, 4 VI 1991; 1 ♂, Mt. Yongmun, Yangpyeong, 9 VII 1989; 5 ♀, Temple Yongmunsa, Mt. Yongmun, 24 V 1987, 3-9 V 1998; 1 ♂, Mt. Yumyeong, 29 V 1983; 1 ♀, Mt. Gwanak, Shinrimdong, Gwanakgu, 29 V 1993. GB- 1 ♂, 1 ♀, Yeongnam Univ., Gyeongsan, 21 VI 1994, 30 V 1994; 14 ♂, 46 ♀, Mt. Sobaek, Yeongju, 5-7 VI 1981, 5 VI 1993; 1 ♀, Valley Heebanggegyok, Mt. Sobaek, 28 V 1999; 1 ♀, Temple Heebangsa, Mt. Sobaek, 7 VI 1974; 2 ♂, 2 ♀, Ojunyaksutang, Ojunri, Mulyamyeon, Bonghwa, 20 V 1998; 1 ♀, Ojunri, Mulyamyeon, 21 V 1998; 1 ♀, Mt. Baekam, Uljin, 28 V 1999. JB- 2 ♂, 3 ♀, Gucheondong, Muju, 21-22 V 1983; 5 ♂, 5 ♀, Mt. Deokyu, 25 V 1993. JN- 1 ♂, Mt. Baekun, Gwangyang, 19 V 1991; 1 ♀, Naju, 5 VII 1996.

*Distribution.* Korea, Northern part of European Russia, Northern and Central Europe, Northern Sakhalin, Mongolia, Siberia, and North China.

*Remark.* The species have been misidentified to *P. longissimus* Pic due to their similarities, but it is easily distinguished by the side margin of the pronotum. This species has curved in archform on the side margin, but *P. longissimus* has sinuated on the side margin.

### ***Podabrus (s. str) longissimus* Pic**

(Figs 1B, 2B)

Exchange, 22: 81.

*Material examined.* GW- 3 ♂, 2 ♀, Mt. Gariwang, Jeongseon, 21 V 1998; 1 ♀, Mt. Daeam, Yanggu, 13 VI 1990; 1 ♂, Sambongyaksu, Mt. Odae, Hongcheon, 4 VI 1998.

*Distribution.* Korea, Russia (Kuril Isl., Sakhalin), and Japan.

*Remark.* The *Podabrus longissimus* was previously recorded from Korea, due to misidentification of *P. annulatus*. The Korean specimens slightly differ from Japanese species: pronotum with more strong angulated hind corner than in Japanese ones, and width of the side margins of the pronotum is narrower than in Japanese one. Authors tentatively treat Korean species as conspecific with Japanese species, *P. longissimus*, and needed a further study to define Korean material.

***Podabrus (Hatchiana) rosinae* Pic, 1904**

(Figs 1C, 2C)

Echange, 20: 25.

*Podabrus rosinae*: Wittmer, 1969: 107; Delkeskamp, 1977: 32; Medvedev and Ryvkin, 1992: 34; Kwon *et al.*, 1996: 155.

*Material examined* (201ex). S- 1 ♀, Mt. Surak, Noweongu, Seoul, 9 V 1998; 1 ♀, Mt. Daemo, Gangnamgu, 31 V 1998. GW- 2 ♂, 1 ♀, Yongdairi, Mt. Naeseolak, Sokcho, 26 V 1983; 1 ♀, Mt. Seolak, 30 V 1998; 1 ♀, Mt. Chiak, Weonju, 5 VI 1992; 1 ♂, 1 ♀, Mt. Obong, Chuncheon, 3 VI 1985, 26 V 1995; 2 ♂, 2 ♀, Mt. Taebaek, Taebaek, 30 V 1999; 2 ♀, Mt. Hyangrobong, Goseong, 18 VI 1967; 2 ♀, Temple Geonbongsa, 22 V 1992; 1 ♀, Mt. Gachilbong, Yanggu, 31 V 1992; 1 ♀, Mt. Daeam, Seohwamyeon, Inje, 13 VI 1990; 16 ♀, Temple Baekdamsa, Mt. Seolak, 3-6 VI 1979, 25 V 1986; 2 ♀, Misanri, Mt. Bangtae, 25 VI 1996; 4 ♀, Mt. Bangtae, 4-6 VI 1999; 2 ♂, 7 ♀, Mt. Gariwang, Jeongseon, 21 V 1998, 22 V 1998; 3 ♂, 6 ♀, Mt. Odae, Pyeongchang, 26 V 1995, 24 VI 1998, 25 VI 1998; 1 ♀, Bangadariyaksu, Mt. Odae 25 VI 1998; 1 ♀, Mt. Unduryeong, 17 VI 1993; 5 ♀, Mt. Odae, Hongcheon, 22-24 VI 1994, 24 VI 1994, 30 VI 1997; 10 ♂, 13 ♀, Sambongyaksu, Mt. Odae, 10 VI 1995, 29-30 VI 1997, 4 VI 1998, 5 VI 1998; 2 ♂, 36 ♀, Mt. Gachilbong, 21-23 VI 1984, 9 VI 1995, 30 V 1997; 2 ♀, Mt. Balgyo, Hwingseong, 6 VI 1998. GS- 3 ♀, Mt. Cheonggye, Gwacheon, 24 VI 1984, 31 VII 1994; 3 ♀, Mt. Cheonma, Namyangju, 2 VI 1968, 11 VI 1981, 26 V 1983; 1 ♀, Namhansanseong, Seongnam, 1 VI 1998; 1 ♀, Stream Pyeongdukcheon, Sujieup, Yongin, 20 V 1998; 1 ♂, 1 ♀, Mt. Hwaak, Gapyeong, 29 V 1998; 1 ♀, Mt. Unak, 31 V 1992; 1 ♀, Mt. Myeongji, 4 VI 1994; 4 ♂, 4 ♀, Temple Yongmunsa, Mt. Yongmun, Yangpyeong, 3 V 1998, 8 V 1998, 9 V 1998, 8-9 V 1998; 3 ♀, Mt. Yongmun, 28-29 V 1982. GB- 5 ♂, 22 ♀, Mt. Sobaek, Yeongju, 5-7 VI 1981; 2 ♂, 1 ♀, Heebanggyegok, Mt. Sobaek, 28 V 1999; 1 ♀, Ojunyaksu, Mulyamyeon, Bonghwa, 20 V 1998; 1 ♂, Ojunri, Mulyamyeon, 21 V 1998. JN- 1 ♀, Mt. Deokyu, Muju, 22 V 1983; 1 ♂, 2 ♀, Gucheondong, 8 VI 1972, 9 VI 1972; 1 ♂, 1 ♀, Imgeolryeong, Mt. Jiri, Gurye, 4 VI 1998, 5. VI. 1998; 2 ♂, 2 ♀, Dangchi, Mt. Jiri, 4 VI 1998, 5. VI. 1998; 1 ♂, 5 ♀, Jikjeon, Mt. Jiri, 3-5 VI 1998, 4 VI 1998.

*Distribution*. Korea, Siberia, and North east China.

*Remark*. The species was first reported by Dr. Wittmer from North Korea, and also this is very common species in South Korea. But it was not identified because of insufficient references in South Korea. This species is first studied systematically from South Korea.

***Podabrus (Hatchiana) glochidiatus* Kazantsev, 1996**

(Figs 1D, 2D)

Zool. Zhurn. 75(2): 206.

*Cantharis (Podabrus) heydeni*: Heyden, 1887: 25. (misid.)

*Cantharis ciusianus*: Cho, 1967: 193; Kim and Nam, 1984b: 329; Kim and Nam, 1984a: 104. (misid.)

*Podabrus heydeni*: Kim, and Kim, 1972a: 78; Lee, and Kwon, 1974: 39; Kim, 1981: 343; Lee *et al.*, 1985: 406; Kim and Park, 1991: 193; Kim *et al.*, 1991: 171; Park, 1992: 265; Kim, 1993: 201;

Paik and Lee, 1995: 395; An, 1995: 23, 53; Kwon *et al.*, 1996: 155. (misid.)

*Prothekmus ciusianus*: Kim and Park, 1991: 63. (misp. and misid.)

*Prothemus ciusianus*: Kim and Lee, 1991: 69; Kim, 1993: 258; Park *et al.*, 1993: 179; Kwon *et al.*, 1996: 155. (misid.)

*Material examined* (353ex). S- 4 ♂, 17 ♀, Mt. Cheonggye, Seochogu, Seoul, 28 V 1989, 31 V 1989, 26 V 1990, 28 V 1991, 30 V 1996, 17 V 1998, 4 VI 1999, 22 V 1999; 1 ♀, Mt. Umyeon, 30 V 1999; 6 ♂, 17 ♀, Mt. Daemo, Gangnamgu, 31 V 1989, 1 VI 1996, 6 VI 1996, 9 V 1998, 13 V 1998, 22 V 1998, 27 V 1998, 23 V 1999; 3 ♀, Mt. Guryong, Gangnamgu, 9 VI 1996, 27 V 1998; 1 ♂, 1 ♀, Mt. Dobong, Dobonggu, 9 V 1998, 20 V 1998. GW- 1 ♀, Mt. Seolak, Sokcho, 30 V 1998; 2 ♂, 6 ♀, Mt. Chiak, Weonju, 15 VI 1999; 1 ♀, Gangchon, Chuncheon, 19 V 1998; 1 ♀, Mt. Hyangrobong, Goseong, 6 VII 1995; 1 ♀, Mt. Taehwa, Yeongweol, 23 V 1982; 1 ♀, Misanri, Mt. Bangtae, Inje, 24 VI 1996; 1 ♀, Seokjundong, Mt. Bangtae, 24 VI 1996; 1 ♀, Hanidong, Mt. Bangtae, 24 VI 1996; 2 ♂, 8 ♀, Mt. Gariwang, Jeongseon, 21 V 1998; 1 ♀, Hongcheon, 25 VI 1986; 3 ♀, Mt. Balgyo, Hwangseong, 6 VI 1998. GS- 1 ♂, 4 ♀, Seoul Grand Park, Gwacheon, 31 V 1997, 22 V 1999, 29 V 1999; 2 ♂, 2 ♀, Gwangreung, Namyangju, 3 VI 1981, 29 V 1983, 20 V 1990, 25 V 1998; 1 ♂, 5 ♀, Mt. Chukryeong, 4 VI 1999; 6 ♀, Mt. Cheonma, 16 V 1982, 6 VI 1982, 24 V 1987, 28 V 1988, 3 VI 1988; 24 ♂, 44 ♀, Mt. Namhan, Hadaewondong, Seongnam, 5 V 1998, 14 V 1998, 16 V 1999, 22 V 1999, 23 V 1999, 25 V 1999, 30 V 1999; 1 ♂, 15 ♀, Namhansanseong, 26 V 1996, 6 VI 1996, 4 V 1997, 17 V 1997, 18 V 1997, 23 V 1997, 22 V 1998, 6 VI 1998, 22 V 1999; 1 ♀, Suweon, 1 V 1985; 1 ♀, Mt. Gwanggyo, 30 V 1992; 1 ♂, Guseongmyeon, Yongin, 23 V 1998; 1 ♀, Mt. Cheonggye, Uiwang, 2 V 1996; 1 ♀, Wanggokdong, 2 VI 1996; 1 ♂, Mt. Surak, Uijeongbu, 15 VII 1993; 5 ♂, 2 ♀, Jeokseongmyeon, Paju, 22 V 1999; 1 ♀, Hanam, 31 V 1998; 1 ♂, 2 ♀, Namhansanseong, 18 V 1997, 17 V 1998, 30 V 1999; 1 ♀, Mt. Geomdan, 29 V 1999; 1 ♀, Paldang, 9 V 1984; 2 ♂, Daeseongri, Gapyeong, 4 VI 1982, 19 V 1983; 1 ♀, Mt. Godong, 13 VI 1982; 4 ♀, Valley Bigumgyegok, 2 VI 1984, 9 VI 1984; 1 ♀, Eomiri, Gwangju, 23 V 1981. CB- 22 ♂, 29 ♀, Mt. Weolak, Jecheon, 9 VII 1991, 27 V 1996, 22 V 1998; 1 ♀, Danweoldong, Chongju, 5 V 1997; 1 ♂, Hwayangri, Gwisang, 25 V 1996; 1 ♀, Mt. Guksabong, Naebukmyeon, Boun, 23 V 1997. CN- 10 ♀, Mt. Mansu, Buyeo, 12 V 1999; 1 ♀, Valley Myeongdaegyegok, Mt. Oseo, Hongseong, 11 VI 1999. GB- 9 ♂, 1 ♀, Munkyeongsaejae, Munkyeong, 26 V 1996; 1 ♂, 1 ♀, Sangchori, 25 V 1997; 1 ♀, Mt. Juhul, 25 V 1997; 22 ♂, 22 ♀, Ojunyaksutang, Mulyamyeon, Bonghwa, 20 V 1998, 21 V 1998; 2 ♀, Valley Bulyounggyegok, Uljin, 29 V 1999. JB- 1 ♀, Mt. Oknyeobong, Iksan, 23 V 1997; 4 ♂, 3 ♀, Mt. Naejang, Jeongeup, 10 VI 1975, 26 V 1994; 1 ♀, Mt. Seonun, Gochang, 21 V 1992; 1 ♂, Mt. Deokyu, Muju, 3 VII 1993; 2 ♀, Mt. Naeso, Buan, 22 V 1992; 1 ♀, Jonggyeri, 21 V 1992. JN- 1 ♂, Valley Piagol, Mt. Jiri, Gurye, 22 V 1999; 2 ♀, Jangseong, Temple Baekyangsa, 24 V 1994.

*Distribution.* Korea.

*Remark.* The species is similar to *P. heydeni* Kiesenwetter of Japan, but it is easily distinguished by the ventral process of the aedeagus. This species has hook-like ventral processes, but absent in *P. heydeni*.



***Podabrus (Hatchiana) jirisanensis* n. sp.**

(Figs 1E, 2E)

*Description.* Body length: 10–15 mm (Elytral shoulder : Length = 1.00 : 5.85). Body color Mainly black.

*Male.* Anterior head of antennal socket yellow, posterior region black; pronotum darkish brown, but side margin yellow; scutellum black; elytra black with narrow pale yellow bordering and sutural line; leg yellow. Head. Flat, with noticeable longitudinal depression behind antennal socket; anterior region of antennal socket scarcely impunctated, posterior region with dense and rough puncturing; posterior margin suddenly narrowed behind eye. Eye relatively large, ratio of eye diameter to intereye distance 1.00 : 2.80. Antennae relatively long, nearly reaching 2/3 of elytra, second segment 1.30 times shorter than third segment, 1.90 times shorter than fourth and following segment. Last segment of maxillary palpi elongated hatchet-like, 2.00 times longer than third segment, 1.33 times longer than second segment; last segment of labial palpi hatchet-like. Pronotum. Width 1.41 times wider than length; anterior width 1.39 times narrower than posterior width; subquadrate, with dense and minute puncturing; median plate with weak depression to posteriorly, with strongly longitudinal groove; side margin slightly sinuated, with round anterior corner and obtusely angulated hind corner. Scutellum triangular, with round apex. Elytra parallel-side, ratio of width at elytral shoulder to length of elytra 1.00 : 3.29. Leg long and slender; all tarsal claws toothed at basal part. Aedeagus. Oval in outline, length 1.38 times longer than width; dorsal process with blunted end; laterophyses exposed to posteriorly; ventral process with hook-like end.

*Female.* Similar to male, but with darkened body color comparing to male, blackish leg, larger and wider body, shorter antennae, and less convex eye.

*Types.* Holotype. JN- ♂, Valley Piagol, Mt. Jiri, Gurye, 22 V 1999 (T.M. Han). Paratypes. 9 ♂, 7 ♀, same locality to holotype, 21 V 1999; 13 ♂, 38 ♀, same locality to holotype, 22 V 1999. S- 1 ♂, Ogeum Park, Songpagu, Seoul, 27 VI 1998. GW- 2 ♀, Temple Baekdamsa, Mt. Naeseolak, Inje, 4–6 VI 1979. GG- 1 ♀, Mt. Hwaak, Gapyeong, 7 VI 1997. GB- 1 ♀, Heebanggyegok, Mt. Sobaek, Yongju, 28 V 1999. JB- 1 ♀, Gucheondong, Muju, 9 VI 1972. JN- 3 ♀, Mt. Jiri, Gurye, 24–25 VI 1986; 1 ♂, Simweon, Mt. Jiri, Gurye, 21 V 1999; 6 ♂, ditto, 23 V 1999; 2 ♀, Imgeolryeong, Mt. Jiri, Gurye, 4–5 VI 1999; 2 ♂, 10 ♀, Jikjeon, Mt. Jiri, Gurye, 2–5 VI 1998; 4 ♀, Dangchi, Mt. Jiri, Gurye, 5 VI 1998; 1 ♀, Temple Ssanggyesa, Mt. Jiri, Gurye, 5 VI 1977; 1 ♀, Haenam, 14 VI 1999.

*Etymology.* The scientific name refers to the type locality, Mt. Jiri.

*Distribution.* Korea.

*Remark.* The species is similar to *P. glochidiatus* Kazantsev, but it is easily distinguished by the side margin of the pronotum. *P. glochidiatus* has curved in archform on side margin, but this species has sinuated on side margin. Also, this species resembles *P. hirugataensis* Takahashi in Japan, but it is easily distinguished by the aedeagus.

***Podabrus (Asiopodabrus) fragiliformis n. sp.***

(Figs 1F, 2F)

*Podabrus macilentus*: Haku, 1936: 124; Cho, 1967: 193; Cho, 1969: 262; Kim and Kim, 1971: 156; Lee and Kwon, 1974: 39; Kim and Nam, 1984b: 329; Kim and Chang, 1987: 104; Park *et al.*, 1993: 179; Kim *et al.*, 1994: 181; Kwon *et al.*, 1996: 155; Kim and Kim, 1998: 171. [Misidentification]

*Podabrus nacilentus*: Kim and Park, 1991: 63; Kim, 1993: 258. (misp. and misid.)

*Podabrus lictorius*: Kim and Kim, 1972a: 78; Kim, 1981: 343; Lee *et al.*, 1985: 406; Park, 1992: 265; Kim, 1993: 201; Kim *et al.*, 1994: 148; Kim *et al.*, 1994: 112; Paik and Lee, 1995: 395; An, 1997: 31; Kim and Kim, 1998: 171. (misid.)

*Description*. Body length: 5–8 mm (Elytral shoulder : Length = 1.00 : 5.00). Body color Mainly pale yellow.

*Male*. Anterior head of eye yellow, posterior region black; pronotum pale yellow, but middle area black; scutellum black to posteriorly yellowish brown; elytra pale yellow; leg yellow. Head. Flat, with weak longitudinal depression behind antennal sockets; anterior region of eye scarcely impunctated, posterior region with dense and rough puncturing; posterior margin suddenly narrowed behind eye. Eye relatively small, ratio of eye diameter to intereye distance 1.00 : 4.10. Antennae relatively long, nearly reaching middle of elytra, ratio of antennal segment 1.25 (second) : 1.00 : 1.58 : 1.58 : 1.58 : 1.50 : 1.50 : 1.33 : 1.33 : 1.50. Last segment of maxillary palpi elongated semi-circular, 2.00 times longer than third segment, 1.45 times longer than second segment; last segment of labial palpi elongated hatchet-like. Pronotum. Width 1.15 times wider than length; anterior width 1.38 times narrower than posterior width; subquadrated, with thin and minute puncturing; median plate with weak depression to posteriorly; side margin strongly sinuated, with obtusely angulated anterior corner and sharp angulated hind corner. Scutellum triangular, with round apex. Elytra parallel-side, ratio of width at elytral shoulder to length of elytra 1.00 : 3.56. Leg long and slender; tarsal claws of fore and middle legs bifid at apex, but hind legs blunt toothed at basal part. Aedeagus. Elongated, length 1.68 times longer than width; dorsal process slender, with sharpened end; ventral process expanded at middle area, with round end.

*Female*. Similar to male, but with larger and wider body; all tarsal claws blunt toothed at basal part.

*Types*. Holotype. S- 1 ♀, Mt. Dobong, Dobonggu, Seoul, 20 V 1988; 1 ♂, ditto, 23 V 1990; 1 ♂, ditto, 21 V 1991; 1 ♀, ditto, 18 V 1994; 1 ♂, 1 ♀, ditto, 17 V 1997; 1 ♂, ditto, 30 V 1999; 1 ♀, Mt. Surak, Noweongu, 9 V 1998; 1 ♀, Sungshin Women's Univ., Seongbukgu, 24 V 1988; 1 ♂, 1 ♀, Mt. Inwang, Jongrogu, 1 VI 1993; 1 ♀, Mt. Umyeon, Seochogu, 10 V 1997; 2 ♀, ditto, 25 V 1997; 1 ♀, ditto, 15 V 1999; 1 ♀, Mt. Chyeonggye, Seochogu, 24 V 1986; 1 ♀, ditto, 30 V 1987; 2 ♂, 1 ♀, Mt. Daemo, Gangnamgu, 9 V 1998; 1 ♀, Heoninreung, Gangnamgu, 24 V 1986; 1 ♀, ditto, 8 V 1988; 1 ♀, ditto, 28 V 1998; 1 ♂, Mt. Guryong, Gangnamgu, 3 V 1999; 1 ♀, Mt. Gwanak, Gwanakgu, 7 V 1994; 1 ♀, ditto, 8 V 1996; 1 ♀, ditto, 19 V 1996; 1 ♀, Shinrimdong, Gwanakgu, 19 V 1993; 1 ♀, Bongjeondong, Gwanakgu, 4 VI 1994. GG- ♂, Mt. Namhan, Hadaeweondong, Seongnam, 5 V 1998 (T.H. Kang). Paratypes. 10 ♂, 8 ♀, same locality to holotype, 3 V 1993; 62 ♂, 8 ♀, same locality to holotype, 5 V 1998; 8 ♂, 3 ♀, same locality to holotype, 14 V 1998. GW- 1 ♀, Mt. Chiak, Weonju, 5

VI 1992; 1 ♀, ditto, 13 VI 1992; 2 ♂, ditto, 16 VI 1999; 1 ♂, Mt. Taebaek, Taebaek, 23 VII 1986; 2 ♀, Mt. Hyangrobong, Goseong, 6 VII 1995; 1 ♂, Yongneup, Mt. Daeam, Yanggu, 24 V 1998; 1 ♂, Mt. Taehwa, Yeongweol, 23 V 1982; 1 ♂, Sangnamri, Mt. Bangtae, Inje, 25 VI 1996; 1 ♂, Misanri, Mt. Bangtae, Inje, 25 VI 1996; 1 ♂, 1 ♀, Mt. Gachilbong, Inje, 12–13 VI 1997; 1 ♂, Mt. Daeam, Seohwamyeon, Inje, 13 VI 1990; 1 ♀, Jeongseon, 22 V 1999; 1 ♀, Mt. Gariwang, Jeonseon, 22 V 1998; 1 ♂, 2 ♀, Mt. Gyeong, Pyeongchang, 16 VI 1993; 8 ♂, 9 ♀, Mt. Odae, Pyeongchang, 24 VI 1998; 1 ♂, 1 ♀, Bangadaryaksu, Mt. Odae, Pyeongchang, 25 VI 1998; 1 ♀, Mt. Hwiryongbong, Pyeongchang, 22 V 1998; 2 ♀, Sambongyaksu, Mt. Odae, Hongcheon, 29–30 VI 1997; 1 ♂, ditto, 4 VI 1998; 8 ♂, 3 ♀, ditto, 5 VI 1998; 4 ♀, Jogaedong, Mt. Odae, Hongcheon, 30 VI 1997; 1 ♀, Mt. Gachilbong, Hongcheon, 21–23 VI 1984; 1 ♂, ditto, 30 V 1997. GS– 5 ♂, Mt. Gwanak, Gwacheon, 26 V 1989; 1 ♂, 1 ♀, ditto, 4 VI 1994; 2 ♀, Gwangreung, Namyangju, 15 V 1975; 1 ♂, 1 ♀, ditto, 29 V 1983; 1 ♂, Cheongpyeong, Namyangju, 24 V 1996; 1 ♀, Mt. Cheonma, Namyangju, 27 V 1995; 1 ♂, Mt. Chukryeong, Namyangju, 4 VI 1999; 1 ♂, Mt. Gwanggyo, Suwon, 10 V 1986; 1 ♀, ditto, 10 V 1995; 1 ♀, Daeyadong, Shiheung, 21 V 1995; 1 ♂, Mt. Cheonggye, Uirwang, 2 VI 1996; 1 ♀, Temple Bokwangsa, Mt. Aengmubong, Paju, 15 IV 1984; 1 ♀, Is. Ganghwa, 26 V 1984; 1 ♀, Namhansanseong, Gwangju, 20 V 1998; 1 ♀, Temple Yongmunsa, Mt. Yongmun, Yangpyeong, 8 V 1998. CB– 1 ♀, Mt. Weolak, Jecheon, 27 V 1993; 5 ♂, 21 ♀, ditto, 22 V 1998; 1 ♂, 1 ♀, Hwayangri, Gwisan, 25 V 1996; 2 ♀, Suanbo, Gwisan, 7 V 1999; 1 ♀, Stream Sanggacheon, Oisokmyeon, Boun, 14 V 1999. CN– 1 ♀, Mt. Gwangduk, Cheonan, 18 V 1994; 1 ♀, Mt. Mansu, Buyeo, 12 V 1999; 1 ♀, Cheongyang, 21 V 1987. GB– 1 ♀, Munkyeongsaejae, Munkyeong, 26 V 1996; 1 ♂, Ojunri, Mulyamyeon, Bonghwa, 21 V 1998; 1 ♀, Ojunyaksutang, Ojunri, Mulyamyeon, Bonghwa, 20 V 1998; 1 ♀, Mt. Juwang, Naeweondong, Yeongduk, 4 VI 1989; 9 ♂, 2 ♀, Valley Bulyeonggyegok, Uljin, 2 V 1999. JB– 1 ♂, 3 ♀, Mt. Naejang, Jeongeup, 10 VI 1975; 1 ♀, Mt. Deokyu, Muju, 25 V 1993; 1 ♀, Daebulri, Muju, 26 V 1993. JN– 1 ♀, Temple Hwaesamsa, Mt. Jiri, Gurye, 23 V 1984; 1 ♂, 1 ♀, Dangchi, Mt. Jiri, Gurye, 4 VI 1998; 2 ♀, Jikjeon, Mt. Jiri, Gurye, 3 VI 1998; 1 ♂, 1 ♀, ditto, 4 VI 1998; 3 ♀, Imgeolryeong, Mt. Jiri, Gurye, 5 VI 1998; 2 ♂, 2 ♀, Valley Piagol, Mt. Jiri, Gurye, 21 V 1999; 4 ♂, 5 ♀, ditto, 22 V 1999; 2 ♂, 2 ♀, Mokpo, Muan, 2 V 1984.

*Etymology.* The scientific name is derived from the combination of *fragilis* and *forma*, because the species is very similar to *P. fragilis* Nakane & Makino.

*Distribution.* Korea.

*Remark.* The species is similar to *P. macilentus* Kiesenwetter and *P. fragilis* Makino & Nakane from Japan, but it is easily distinguished by ventral process of aedeagus. This species has ventral process which is expanded at middle area with round end, but *P. macilentus* has ventral process expanded at basal part with sharp end. Also, that of *P. fragilis* is flat with round end.

### ***Podabrus (Asiopodabrus) circumangulatus* n. sp.**

(Figs 1G, 2G)

*Podabrus lictorius*: Lee and Kwon, 1974: 39; Kwon *et al.*, 1996: 155. (misid.)

*Podabrus temporalis*: Lee *et al.*, 1985: 406; Kim *et al.*, 1992: 154; Kim *et al.*, 1994: 148; Paik and Lee, 1995: 395; Kim and Kim, 1996: 48; Kim and Kim, 1996: 128; Shin *et al.*, 1996: 301; An,

1997: 31. (misid.)

*Podabrus tempordalis*: Kim and Kim, 1998: 171. (misp. and misid.)

*Podabrus tempiralis*: Park, 1992: 265. (misp. and misid.)

*Description.* Body length: 8–11 mm (Elytral shoulder : Length = 1.00 : 4.81). Body color Mainly pale yellow.

*Male.* Anterior head of eye yellow, posterior region black; pronotum pale yellow, but middle area black; scutellum black; elytra pale yellow; leg yellow. Head. Flat, with weak longitudinal groove behind antennal socket; anterior region of eye scarcely impunctated, posterior region with minute puncturing; posterior margin suddenly narrowed behind eye. Eye relatively small, ratio of eye diameter to intereye distance 1.00 : 4.33. Antennae relatively long, nearly reaching middle of elytra, ratio of antennal segment 1.29 (Second) : 1.00 : 1.29 : 1.29 : 1.29 : 1.35 : 1.18 : 1.18 : 1.18. Last segment of maxillary palpi elongated semi-circular, 2.00 times longer than third segment, 1.38 times longer than second segment; last segment of labial palpi elongated hatchet-like. Pronotum. Width 1.23 times wider than length; anterior width 1.30 times narrower than posterior width; subquadrate, with thin and minute puncturing; median plate with weak depression to posteriorly, with weak longitudinal groove; side margin strongly sinuated, with round anterior corner and sharp angulated hind corner. Scutellum triangular, with sharp apex. Elytra parallel-side, ratio of width at elytral shoulder to length of elytra 1.00 : 3.45. Leg long and slender; tarsal claws of fore and middle legs bifid at apex, but hind legs blunt toothed at basal part. Aedeagus. Elongated, length 1.93 times longer than width; dorsal process slender, with sharp end; ventral process slender, but slightly expanded at middle area, with round end.

*Female.* Similar to male, but with slightly wider body; all tarsal claws blunt toothed at basal part.

*Types.* Holotype. JN- ♂, Valley Piagol, Mt. Jiri, Gurye, 22 V 1999 (T.M. Han). Paratypes. 1 ♀, same locality to holotype, 15 VI 1997; 1 ♀, same locality to holotype, 22 V 1999. GW- 1 ♀, Mt. Chiak, Weonju, 6 VI 1992; 2 ♂, 2 ♀, Mt. Taebaek, Taebaek, 30 V 1999; 1 ♀, Mt. Bangtae, Inje, 4–6 VI 1998; 2 ♀, Mt. Gariwang, Jeongseon, 21 V 1998; 1 ♀, ditto, 22 V 1998; 1 ♂, Mt. Sangweol, Jeongseon, 17 VI 1997; 5 ♂, 10 ♀, Mt. Gachilbong, Hongcheon, 21–23 VI 1984. GG- 1 ♀, Mt. Cheonma, Namyangju, 20 V 1984; 1 ♀, ditto, 23 V 1984. CB- 1 ♂, Mt. Weolak, Jecheon 17 VI 1997. CN- 1 ♀, Temple Kabsa, Mt. Gyeryong, Gongju, 5–7 VI 1997. GB- 2 ♀, Mt. Sobaek, Yeongju, 5 VI 1981; 1 ♂, ditto, 6 VI 1981; 1 ♀, Heebanggyegok, Mt. Sobaek, Yeongju, 28 V 2000; 1 ♂, Temple Heebangsa, Mt. Sobaek, Yeongju, 7 VI 1974; 1 ♀, Ojunri, Mulyamyeon, Bonghwa, 21 V 1998; 1 ♂, 1 ♀, Dalgi, Mt. Juwang, Yeongdeok, 5 VI 1989; 1 ♀, Second Falls, Mt. Juwang, Yeongdeok, 4 VI 1989; 1 ♀, Third Falls, Mt. Juwang, Yeongdeok, 4 VI 1989; 1 ♀, Naeweondong, Mt. Juwang, Yeongdeok, 4 VI 1989; 1 ♂, Temple Unmunsa, Mt. Unmun, Cheongdo, 20 V 1989. JB- 1 ♂, Gucheondong, Muju, 9 VI 1970; 1 ♂, ditto, 9 VI 1972; 1 ♂, Daebulri, Seolcheonmyeon, Muju, 26 V 1993; 1 ♀, Samgongri, Muju, 24 V 1993. JN- 1 ♂, Mt. Jiri, Gurye, 25 VI 1986; 1 ♀, ditto, 26 VI 1986; 1 ♂, 1 ♀, Imgeolryeong, Mt. Jiri, Gurye, 4 VI 1998.

*Etymology.* The scientific name is based on the anterior angles of pronotum, and derived from the combination of circum and angulatus, because this species has the anterior corner of pronotum with rounded angle.

*Distribution.* Korea.

*Remark.* The species is similar to *P. takaii* Makino & Nakane from Japan, but it is easily distinguished by the ventral process of aedeagus. Ventral process of this species is flat, but it is expanded at basal part in *P. takaii*.

## Doubtful record

### ***Podabrus nigriventris* Fischer, 1844**

Bull. Soc. Imp. Nat. Moscou 17(1): 33.

*Podabrus spec. prope nigriventris*: Wittmer (1969: 108).

*Podabrus nigriventris*: Kwon *et al.* (1996: 155).

*Distribution.* North Korea and Volyn.

*Remark.* The species was recorded by Wittmer (1969) from North Korea, but we could not find any specimens or other reports.

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## 韓國產 병대벌레科 (딱정벌레目)의 分類學的 研究 II. Cantharinae 亞科: Podabrus 屬

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韓國產 *Podabrus* 屬은 Heyden(1887)이 *P. heydeni* Kiesenwetter를 처음으로 報告한 후, 現在까지 총 9種이 기록되었지만, 5種이 오동정으로 확인되었으며, 3新種, *P. jirisanensis* n. sp., *P. fragiliformis* n. sp., *P. circumangulatus* n. sp.을 발견, 記載하였다. 分布가 의심스러운 *P. nigriventris* Fischer는 본 논문에서 재확인하지 못하였다. 또한 Cantharinae 亞科에 속하는 屬과 *Podabrus* 屬에 속하는 種에 대한 검색표와 채집지 및 해부현미경 사진을 수록하였다.

검색어 : 분류, 딱정벌레목, 병대벌레과, Cantharinae, *Podabrus*, 한국

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